R09

Code No: C8802

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I Semester Examinations, March/April 2011

SIGNAL CONDITIONING CIRCUITS

(ELECTRONICS AND INSTRUMENTATION)

Time: 3hours **Max. Marks: 60**

Answer any five questions

All questions carry equal marks

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1. Design a Practical differentiator to differentiate an input signal that varies in frequency from 20 Hz to 1 K Hz.
   (a) If a sine wave of 1V peak at 1000 Hz is applied to the above differentiator, draw its output wave form.
   (b) If a square wave of 1V peak at 500 Hz is applied to the above differentiator, draw its output wave form. [8+2+2]

2. (a) Calculate upper and lower cutoff frequencies for a Band Pass active filter with R1=R2=10Kohms, Rf1=Rf2=100Kohms, R_L=R_H=10Kohms, C_L= 1µF & C_H=1 pF.
   (b) Draw operational amplifier in conjunction with capacitance Transducers and derive relation for output voltage. [8+4]

3. An analog transducer with a 0-10V input is able to distinguish a change of 10mv in its input signal.
   (a) Calculate its resolution.
   (b) Calculate no of bits of an ADC so that the digital output has almost the same resolution as the above transducer.
   (c) Calculate also Quantization error.
   (d) No of decision levels and comment on results. [3+2+3+4]

4. (a) Construct the circuit of instrumentation amplifier using 3 op-amp's and explain in detail.
   (b) Derive the relation for each op-amp output voltage in an instrumentation amplifier. [6+6]

5. Explain the principle of operation of the following
   (a) Carrier amplifier
   (b) Variable Oscillator. [6+6]

6. (a) Explain Charge amplifiers with sketch.
   (b) Explain the working Chopper and low drift amplifiers [6+6]

7. (a) Explain Signal conditioning circuits for push pull type transducers.
   (b) Explain direct digital converter [6+6]

8. (a) Explain briefly Data acquisition system with block diagram.
   (b) Explain the need of Microprocessors and Microcontrollers for signal conditioning. [8+4]

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